

REMARKS

In response to the above Office Action, claim 1 has been amended to include the subject matter of claims 3 and 7, which have been cancelled. In addition, in claim 1 the discontinuous phase of the polyolefin resin has been restricted to a longitudinal direction as shown in Fig. 3 and the water pressure resistance to 5.2kPa or more. Support for the lower water pressure resistance value can be found on page 6, line 34 to page 7, line 13, Table 1 on page 23, and Figure 1.

From Fig. 1, the minimum of the water pressure-resistance within a range of 5 to 75 wt% of the mixing amount of the polyolefin resin in the extremely fine fiber layer is at a point of 75 wt% of the mixing amount of the polyolefin resin and, as shown in Table 1, the water pressure-resistance of Example 5, in which the mixing amount of the polyolefin resin in the extremely fine fiber layer is 75 wt%, is 5.2 kPa.

In addition, in claim 11 and claims 12 and 13 dependent therefrom, the MFR has been defined as set forth on page 9, lines 6-24 of the specification. It is believed this should avoid the Examiner's noted objection to these claims.

In the Office Action the Examiner rejected claims 1-17 under 35 U.S.C. §103(a) for being obvious over U.S. Patent No. 5,178,931 to Perkins et al., hereafter Perkins, in view of U.S. Patent No. 6,548,431 to Bansal.

An object of the present invention is to provide a highly water-resistant polyester nonwoven fabric that is excellent in water resistance and has a high heat resistance and a high tensile strength.

The present inventors have discovered that the above objects can be achieved by forming a laminated nonwoven fabric out of (1) an extremely fine fiber nonwoven fabric wherein the fibers are prepared by mixing a polyester resin with a specific amount

of a polyolefin resin and melt extrusion spinning the mixture so that discontinuous hydrophobic points (areas) are scattered in a fiber surface and (2) a filamentary fiber nonwoven fabric.

Namely, the present invention provides a highly water pressure-resistant polyester nonwoven fabric composed of a laminated nonwoven fabric structure, wherein an extremely fine fiber nonwoven fabric layer formed out of extremely fine fibers composed of a polyester resin material that is mixed with 5% to 75% by weight of a polyolefin resin and having a fiber diameter of 5 μm or less, and a filamentary fiber nonwoven fabric layer mainly containing a polyester resin and having a fiber diameter of 7 μm or more are integrated by thermocompressive bonding, wherein a discontinuous phase, in a longitudinal direction, of the polyolefin resin is scattered in a surface of the extremely fine fibers forming the extremely fine fiber nonwoven fabric, and the laminated structure has a water pressure-resistance of 5.2 kPa or more.

The very high water pressure resistance exhibited by the polyester nonwoven fabric of the present invention is obtained by the hydrophobic polyolefin resin being distributed as a discontinuous phase, in a longitudinal direction, in the fiber surface of the polyester extremely fine fibers forming the polyester extremely fine fiber nonwoven fabric component, as shown in Fig. 3, the discontinuously distributed hydrophobic polyolefin resin functioning as hydrophobic points.

As is apparent from Fig. 1, when the mixing amount of the polyolefin resin in the extremely fine fiber layer is within a range of 5 to 75 wt%, a very high water pressure resistance of more than 5.2 kPa can be obtained.

In Perkins, there is no description and no suggestion regarding the above structure wherein a hydrophobic polyolefin resin is distributed as a discontinuous phase, in a longitudinal direction, in a fiber surface of extremely fine polyester fibers forming an extremely fine fiber nonwoven fabric layer.

Also in Bansal, there is no description and no suggestion regarding the above structure wherein a hydrophobic polyolefin resin is distributed as a discontinuous phase, in a longitudinal direction, in a fiber surface of extremely fine polyester fibers forming an extremely fine fiber nonwoven fabric layer.

Bansal discloses a sheath-core arrangement, a side-by-side arrangement, a segmented pie arrangement and an "islands in the sea" arrangement as an arrangement of polymer components. The Examiner argues that the "islands in the sea" arrangement would be the same as the structure of the present invention.

However, as now defined in claim 1, the structure of the present invention is different from the structure of an "islands in the sea" arrangement, because an island component forms a filament in a sea component. In other words, it is not distributed as a discontinuous phase in a longitudinal direction;

Enclosed for the Examiner's interest is a copy of U.S. Patent No. 3,692,423 which discloses an "islands in the sea" type composite filament. In column 1, lines 44 to 47, it is described that "islands in a sea" type composite filaments have a high rigidity and are useful for preparing bundles of superfine filaments having a very small fineness by removing the sea constituent. It is clear from this description that the island component in an "islands in the sea" type composite filament forms bundles of superfine

filaments. This is not the same as an arrangement in a longitudinal direction as shown in Fig. 3.

Since M.P.E.P. §2143 requires that all claim limitations be shown or suggested in the combination of prior art references relied on to establish a prima facie case of obviousness, and neither Perkins nor Bansal discloses the claimed arrangement of the polyolefin resin in the extremely fine polyester fibers forming the extremely fine fiber nonwoven fabric layer of the claimed polyester nonwoven fabric, it is submitted that the claims cannot be considered obvious over this combination of references. Their withdrawal as a ground of rejection of the claims under §103(a) is therefore requested.

It is believed claims 1, 2, 4-6 and 8-17 are in condition for allowance.

In view of the foregoing amendments and remarks, Applicants respectfully request reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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Dated: October 15, 2007

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Attachments: Copy of U.S. Patent No. 3,692,423

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